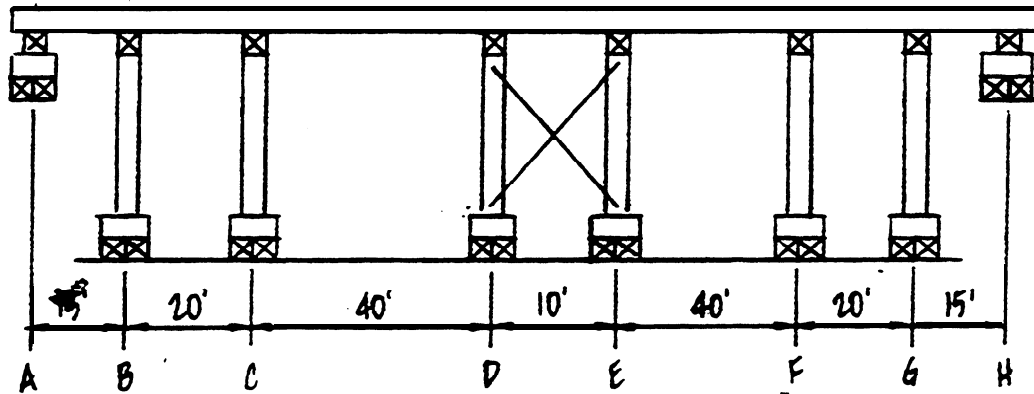


EXAMPLE NO. 10
HORIZONTAL FORCES IN THE LONGITUDINAL DIRECTION



GIVEN: DL_1 = WEIGHT OF CONCRETE/GIRDER BASED ON $160 \text{ LB/CF} = 2000 \text{ PLF}$

DL_2 = WEIGHT OF FALSEWORK STRINGER = 100 PLF

THE CONTROLLING HORIZONTAL FORCE IS 2% DEAD LOAD

INVESTIGATE THE STABILITY OF THE FALSEWORK BENTS WHEN THE HORIZONTAL DESIGN FORCE IS APPLIED IN THE LONGITUDINAL DIRECTION

CALCULATE THE HORIZONTAL DESIGN FORCE

<u>SPAN</u>	<u>HORIZONTAL DESIGN FORCE</u>	<u>SPAN</u>	<u>HORIZONTAL DESIGN FORCE</u>
AB = GH	$0.02(2000+100)15 = 630 \#$	CD = EF	$0.02(2000+100)40 = 1680 \#$
BC = FG	$0.02(2000+100)20 = 840 \#$	DE	$0.02(2000+100)10 = 420 \#$

CALCULATE THE FRICTION TRANSFER CAPABILITY (FTC)

FROM SECT. 5-1.04 OF FALSEWORK MANUAL, THE FTC IN THE UNLOADED CONDITION IS THE FTC THAT WILL BE DEVELOPED BY THE DEAD LOAD OF THE FALSEWORK MEMBERS PLUS AN ALLOWANCE FOR THE WEIGHT OF FORMS AND REINFORCING STEEL

WEIGHT OF FALSEWORK MEMBERS = 100 PLF

$\mu = 0.30$ (SECT. 3-3.03 OF FW MANUAL)

WEIGHT OF FORMS AND REINFORCING STEEL = $\frac{10}{160}(2000 \text{ PLF}) = 125 \text{ PLF}$

CALCULATE THE FRICTION TRANSFER CAPABILITY (FTC) - CONTINUED

LOCATION		FTC	LOCATION		FTC
BETWEEN BENT	AND STRINGER		BETWEEN BENT	AND STRINGER	
A	AB	$0.30(100+125) \frac{15'}{2} = 506\#$	C	CD	$0.30(100+125) \frac{40'}{2} = 1351\#$
B	BA		D	DC	
G	GH		E	EF	
H	HG		F	FC	
B	BC	$0.30(100+125) \frac{20'}{2} = 675\#$	D	DE	$0.30(100+125) \frac{10'}{2} = 338\#$
C	CB		E	ED	
F	FG				
G	GF				

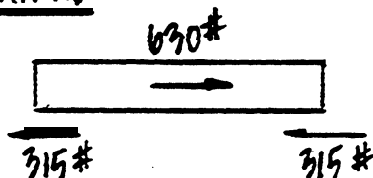
AS PER SECT. 5-1.02 OF FALSEWORK MANUAL:

BENTS A & H ARE INTERNALLY STABLE (SINCE POST HEIGHT < 3 TIMES POST WIDTH) AND BRACING IS NOT REQUIRED.

BENTS B, C, D, E, F, & G ARE NOT INTERNALLY STABLE (SINCE POST HEIGHT > 3 TIMES POST WIDTH) AND BRACING, BLOCKING, TIES, ETC. ARE REQUIRED.

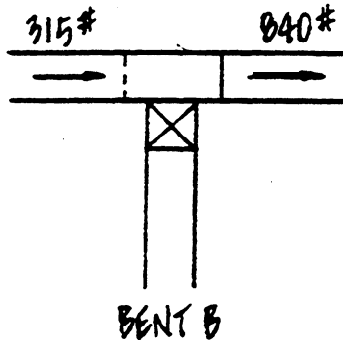
IN THE CASE OF THIS EXAMPLE PROBLEM, BENTS D & E ARE MADE STABLE BY DIAGONAL BRACING AND BENTS B, C, F, & G WILL HAVE TO BE MADE STABLE BY STRUTTING THE HORIZONTAL FORCES TO THE STABLE BENTS.

SPAN AB



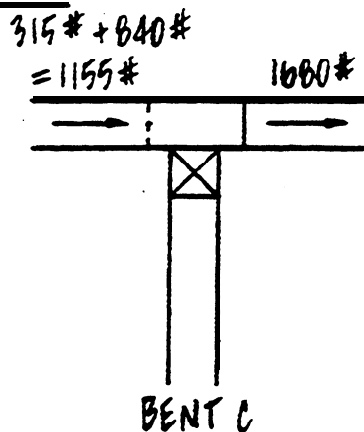
315# IS TAKEN AT STABLE BENT A, AND SINCE THE 315# IS LESS THAN THE FTC = 506#, NO MECHANICAL CONNECTION IS REQUIRED.

SPAN BC



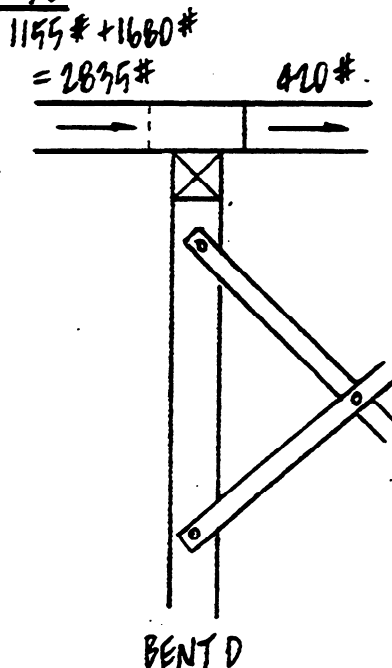
SINCE THE FTC BETWEEN BENT B AND STRINGER BA = $506\# > 315\#$, AND SINCE THE FTC BETWEEN BENT B AND STRINGER BC = $675\# > 315\#$, THE $315\#$ COMING FROM SPAN AB CAN BE STRUTTED AHEAD TO A STABLE BENT AND NO MECHANICAL CONNECTIONS ARE REQUIRED.

SPAN CD



SINCE THE FTC BETWEEN BENT C AND STRINGER CB = $675\# < 1155\#$, AND THE FTC BETWEEN BENT C AND STRINGER CD = $1350\# > 1155\#$, A MECHANICAL CONNECTION BETWEEN BENT C AND STRINGER CB WILL BE REQUIRED, BUT FRICTION BETWEEN BENT C AND STRINGER CD WILL BE ADEQUATE TO STRUT THE $1155\#$ COMING FROM SPANS AB & BC TO A STABLE BENT.

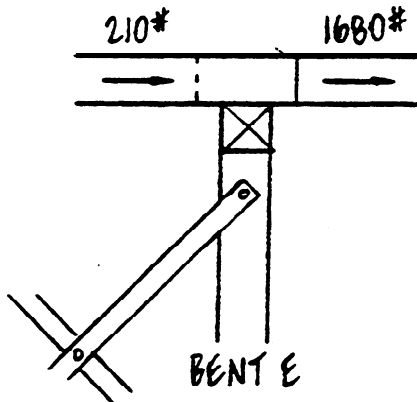
SPAN DE



SINCE THE FTC BETWEEN BENT D AND STRINGER DE = $1350\# < 2835\#$, A MECHANICAL CONNECTION BETWEEN BENT D AND STRINGER DE WILL BE REQUIRED.

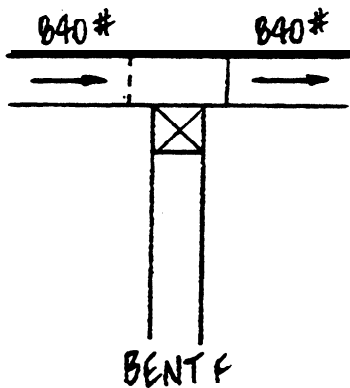
THE $420\#$ IN SPAN DE WILL CAUSE A REACTION OF $210\#$ (AT EACH END) WHICH IS $<$ FTC BETWEEN BENT D AND STRINGER DE = $336\#$. THEREFORE, THE $210\#$ AT BENT D CAN BE TRANSFERRED TO THIS STABLE BENT BY FRICTION. THE DIAGONAL BRACING AT BENT D THEN MUST TAKE $2835\# + 210\# = 3045\#$

SPAN EF



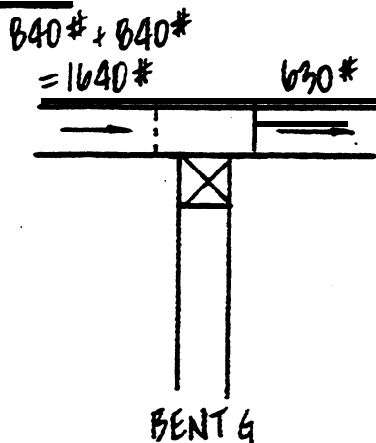
SINCE THE FTC BETWEEN BENT E AND STRINGER ED = $336\# - 210\#$, THE $210\#$ CAN BE TAKEN TO THE STABLE BENT E THROUGH FRICTION. THE $1680\#$ IN SPAN EF WILL CAUSE A REACTION OF $840\#$ (AT EACH END) AND SINCE THE FTC BETWEEN BENT E AND STRINGER EF = $1350\# > 840\#$, THE $840\#$ CAN BE TAKEN TO THE STABLE BENT E THROUGH FRICTION AND THE DIAGONAL BRACING WILL THEN HAVE TO TAKE $210\# + 840\# = 1050\#$.

SPAN FG



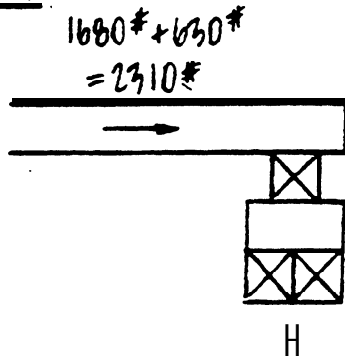
SINCE THE FTC BETWEEN BENT F AND STRINGER FE = $1350\# > 840\#$ AND SINCE THE FTC BETWEEN BENT F AND STRINGER FG = $675\# < 840\#$, A MECHANICAL CONNECTION BETWEEN BENT F AND STRINGER FG WILL BE REQUIRED TO STRUT THE $840\#$ COMING FROM SPAN EF TO STABLE BENT H.

SPAN GH



SINCE THE FTC BETWEEN BENT G AND STRINGER GF = $675\# < 1680\#$ AND SINCE THE FTC BETWEEN BENT G AND STRINGER GH = $506\# < 1680\#$, MECHANICAL CONNECTIONS BETWEEN BOTH STRINGERS AND BENT G WILL BE REQUIRED TO STRUT THE FORCES TO STABLE BENT H.

BENT H



SINCE THE FTE BETWEEN BENT H AND STRINGER HG = $906\# < 2310\#$, A MECHANICAL CONNECTION IS REQUIRED TO GET THE FORCES COMING FROM SPANS EF, FG, & GH INTO THE STABLE BENT H.

THE DIAGONAL BRACING FOR BENTS D & E MUST BE CAPABLE OF RESISTING A TOTAL HORIZONTAL FORCE OF $3045\#$ FROM BENT D + $1050\#$ FROM BENT E = $4095\#$.

A SIMILAR ANALYSIS IS REQUIRED WHEN THE HORIZONTAL DESIGN FORCES ARE APPLIED IN THE OPPOSITE DIRECTION.